

Hybrid maritime VSAT networks are coming

Alan Gottlieb* navigates through the latest developments in maritime VSAT, providing advice on what shipowners need to know before investing

Configuring a maritime VSAT system and choosing an appropriate vendor has never been more complex. Maritime executives face a mind-wrenching array of system and vendor choices, and an army of competing vendors all touting their own solutions. They have to navigate through this potential minefield of choices to reach their ultimate goal, which should be the best value service. The numerous different vendors and frequency bands, and the coming hybrid Ka-/Ku-band network combinations further complicate the choice.

VSAT is expensive, but for shipowners willing to wait 18 months to two years, new Ka-band satellite constellations used in 'roaming' combination with Ku-Band will cut the cost of global VSAT bandwidth by a third, or more, driving the prices of competing services down. Of course, there is more to a service than just bandwidth, and vessel owners need to understand that with maritime VSAT, there is a lot more than just bandwidth and connectivity involved.

Unlike buy-by-the-byte L-band services, fixed rate, always-available connectivity needs to be managed. This means operators are going to need a comprehensive array of value-added services that allow them carry out do such functions as automatically switching between IP sources (such as from VSAT to Inmarsat FleetBroadband (FB)/Iridium OpenPort back-up) and prioritising bandwidth for key business applications. The value-added services also have functions such as managing software and virus updates, managing and servicing shipboard PCs,



VSAT can include antenna leasing or purchasing

regulating how frequently and for how much time crew members can access the Internet. They can be mechanisms for charging (if that is a ship owner's intent) through scratch cards, voice over IP (VoIP) and GSM cellular services, etc. Whatever the choice of connectivity, as long as shipowners have fixed, unlimited network access, they will need these capabilities.

At the moment, buyer's choices are rather limited

to a Ku-band VSAT service or Inmarsat's FB. A basic VSAT system capable of providing 'commercial class' service can cost around US\$3,200 per month including antenna lease. That is for an average of 512 Kbps downlink or 256 Kbps downlink with 40 Kbps committed information rate (CIR), resulting in a typical three-year contract commitment for a single vessel of over US\$100,000. Consequently, maritime VSAT investment is significant, and equipping even a small fleet can run into millions of dollars. The alternative is to buy the Inmarsat FB shared corporate access plan (SCAP) or the FB all-you-can-eat (AYCE) plan with services delivered through FB 500 terminals.

The Inmarsat SCAP plan has been relatively popular among vessel operators who want to use the service primarily for business purposes and not for crew Internet access. Allowing crew to use the service can hugely increase the consumption of



Telenor's Thor 7 satellite will provide Ka-band coverage over the North Atlantic, Europe and the Middle East

data, and account for as much as 70 per cent of the monthly usage – up to 30GB. So, if shipowners are not currently interested in providing unfettered crew access to the Internet, they can get 2–5GB of capacity starting at US\$2,000 per month, plus the relatively small investment of US\$10,000 for the antenna.

ISSUES TO CONSIDER

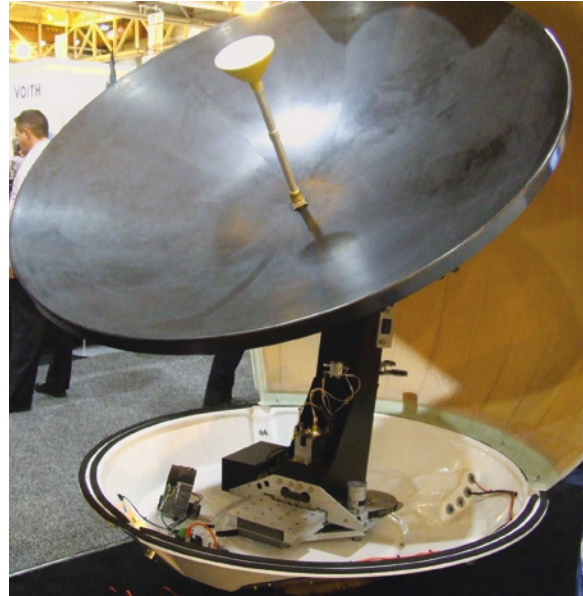
Whichever service shipowners consider, here are a few recommendations in light of some of the typical pitfalls faced by buyers:

Parameter	Advice
Understand pricing:	When buying satellite capacity, shipowners should not buy based on price, unless they have compared the services' technical specifications. Fleet managers need to know the uplink and downlinks bandwidths, the contention ratio of the network and the CIR that is offered. Typically the contention ratio – the number of customers sharing a fixed amount of bandwidth – should not exceed 10:1 and most serious users will be looking for a minimum CIR of 32 Kbps. The bandwidth offered and CIR should be guaranteed in a service level agreement, and the vendor should provide software to the user to confirm that the performance experienced is in line with commitments in this agreement.
Lease or buy antennas	Most maritime VSAT services are bought through the vendor with the antenna included in a lease package. While leasing is an attractive alternative to the capital outlay, there are significant disadvantages in leasing through the bandwidth service provider. If you are dissatisfied and want to change provider, you have to remove the existing vendor's antenna and replace it with the new vendor's equipment. Switching out the antennas can be costly and inconvenient and in many cases almost impossible in the short term as drydocking may be required. If you need to limit Capex, lease through a third party leasing company or use conventional financing. Never let your vendor lock you into continuing an unsatisfactory service.
Trials: are they useful?	What appears to be a successful trial may not, in fact, be representative of the service the owner will receive once they have signed the contract. An early adopter of a new network is likely to experience superior performance since the network is still under populated. Also, due to the very stiff competition in the industry, offering a trial user preferential access to the service at high bandwidth can easily be done as a means to facilitate the sale. The best protection against this is to insist on a CIR, have performance parameters specified in the service level agreement, and be sure the vendor supplies a web interface where managers can monitor the bandwidth delivered.
Fair access policy	Usually found buried in the small print section of the Terms and Conditions of Sale, this clause allows the vendor to 'throttle back' the service level if the user exceeds certain parameters of usage. While it is understandable that a vendor would have to prevent massive over-use of its resources, we believe that the limits of usage must be clearly specified. A means to monitor usage should be provided to the customer and warnings should be sent prior to the reduction or suspension of service.

On the other hand, buyers of the Inmarsat 'unlimited' AYCE plan need to pay particular attention to the limitations inherent in the use of this service. While at face value it may seem attractive, as the amount of L-band capacity of the service is limited, Inmarsat has imposed a very strict 'fair use policy' that could disappoint buyers expecting truly unlimited usage privileges. According to a recent release of the terms and conditions from Inmarsat partner Astrium, prohibitions are generally stricter than most maritime VSAT usage policies. The services not allowed include:

- peer-to-peer file sharing such as BitTorrent, DirectConnect, e-Donkey, FastTrack Kazaa, Gnutella, Open FT and any other current P2P clients
- mainstream un-optimised commercial VoIP clients, such as Skype
- optimised satellite-orientated VoIP clients and solutions
- movie downloads such as MP3/MP4 content
- broadcast or peer-to-peer streaming (including mainstream video sites such as YouTube and Internet radio)
- virtual private networks (VPN)
- large updates such as system operating system upgrades
- any traffic deemed inappropriate or detrimental to the Inmarsat network.

So if a shipowner plans to offer seafarers web-surfing privileges, then we recommend they invest in Ku-band VSAT service with L-band back-up (FB or OpenPort). Inmarsat offers an attractive conventional Ku-band with L-band back-up option in its XpressLink service, at a very competitive



Antennas can be configured for both Ku- and Ka-band

price, with an option to upgrade to Ka-band Global Xpress (GX) when this becomes available. As long as shipowners are not mandated to upgrade to GX, they can wait and see how GX performs in all weather conditions before deciding whether or not they want to upgrade.

If shipowners are not interested in providing Internet to the crew, then the Inmarsat FB SCAP plans offering from 2-5GB per month, or plans from rivals such as KVH Industries, are suitable alternatives. However, if they are using 150MB, or less, per month, then they should take a serious look at KVH or OpenPort, as Inmarsat has made its low volume plans expensive for users in that usage range.

Within the next two years, shipowners will be faced with a vastly expanded set of network alternatives, and prices will fall. In addition to Ku-band with L-band back-up, users will be able to choose between hybrid Ku-/Ka-band networks, Intelsat Epic high-capacity Ku-band beams, and GX Ka-band services. The technology to facilitate the new hybrid frequency networks, including roaming capable hubs from iDirect and multi-frequency switching antennas from SeaTel, Intellian, and others, will be available by mid 2014.

Initially, we expect to see new networks

Suggested VSAT buyer questions

- contention rates
- committed information rates
- average and maximum data rates
- fair-use policy
- volume caps
- over-usage charges
- extension options
- beam coverage

that combine regional European Ka-band services such as Telenor's Thor 7 network with Intelsat's Ku-band global mobility network, and other Ku-band satellites from Eutelsat and SES, etc., to produce a system that offers customised cost structures based on a geographical distribution of a user's vessels. As a third of the world's ships typically operate in Europe and the North Atlantic, a considerable number of vessels could use low-cost Ka-band bandwidth when in European waters and roam to Ku-band when they need to sail globally.

It is important to note, however, that in reality Ka-band is not less expensive to deliver than Ku-band, given equivalent satellite spot beam infrastructure. If Intelsat, or another satellite operator, decided to put Ku-band spot beams, open to maritime users, over Europe, then hybrid network configurations could lose their price advantage. But we do not see this happening until 2018 at the earliest.

In addition to the fact that the soon to be available hybrid networks are less costly than an all-Ku global network, Ku-band services are significantly more resistant to rain fade than existing Ka-band services. Of course, in the temperate regions, rain fade is nowhere as significant a threat to connectivity as it is in



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South and South East Asian areas.

In terms of satellite networks, if ship operators' vessels are sailing globally and are looking for full-time, fixed-cost services capable of supporting crew Internet access, the new hybrid Ka-/Ku-band networks are likely to be the most attractive choice, especially as Ka-band is likely to perform satisfactorily in temperate climates.

The world of maritime VSAT is complex and rapidly changing. The emergence of Ku-band and Ka-band spot beam infrastructure along with the potential for Internet roaming can

be expected to lower the cost of VSAT services, making them affordable for a significantly larger segment of the maritime market. For those buyers who carefully define IT and crew usage requirements, and who are willing to wait for the coming of technology advances, the benefits should be enormous. **VSAT**

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The company provides market research and strategies to VSAT providers and shipowners, but it receives no commissions from any of the vendors for endorsing their services.

Future Ka and Ku capacity

Recently announced by Intelsat the new EpicNG network will be a high capacity, spot beam overlay to its global mobility network. It will be unique in that it offers highly concentrated, high capacity spot beams over the heaviest trafficked shipping routes, mainly the Great Circle Route across the Atlantic Ocean. It is likely that this will soon be followed by a service over routes around the Pacific Ocean, while the network uses wide beams across less-travelled routes. This assures maximum efficiency and ultimately the ability to lower costs. Most maritime VSAT vendors can be expected to deploy this infrastructure when it is available.

Perhaps the most promoted new service is Inmarsat's Global Xpress (GX). Announced in late summer 2011, GX is Inmarsat's ultimate defence against competitive fixed priced VSAT services. Unique in its ability to provide full global coverage, the service's deployment of Ka-band technology in a full global footprint is yet to be proven, especially its serviceability in the rain-intense regions of South East Asia and the tropics. Consequently, GX faces the same scepticism as Ku-band services initially did. And like those early Ku-band services, GX will have to prove itself as viable in actual use before widespread adoption occurs.